User Manual

Industrial Power Storage System (iPS)

iPS-M Series Battery System

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Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Technical Support and Assistance

1. Visit the Advantech website at http://support.advantech.com where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

Note! *Notes provide optional additional information.*

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item is missing, please contact your dealer immediately.

- iPS-M series battery system x 1
- 4 PIN 13 ~ 19 Vdc System 1 cable x 1
- 4 PIN 12 Vdc System 2 cable x 1
- 6 PIN Remote control cable x 1
- RJ45 - RS232 console cable x 1
- Software CD (Manual and Utilities) x 1
- Warranty card x 1

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. Follow national, state or local requirements to dispose of unit.
17. Maintenance: to properly maintain and clean the surfaces, use only the approved products or clean with a dry applicator.
18. Contact information: No.1, Alley 20, Lane 26, Rueiguang Road Neihu District, Taipei, Taiwan 114, R.O.C. TEL: +886 2-2792-7818.
19. This equipment shall not be used as a life support system.

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Warning! *Any changes or modifications made to the equipment which are not expressly approved by the relevant standards authority could void your authority to operate the equipment.*

Warning! *To prevent electric shock, turn off AC power or unplug AC power cord before remove cover.*

Caution!

1. *Please contact a qualified technician or your retail provider for battery replacement. Do not do it by yourself.*
2. *There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Warning!

1. *Input Voltage rate 100 ~ 240 Vdc, 47 ~ 63 Hz, 4.5 A Max.*
2. *Output Voltage rate.*
   System1: 15 ~ 19 V⎓ , 6 A Max
   System2: 12 V⎓ , 4 A Max

Explanation of Graphical Symbols

⎓	Direct Current

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Chapter 1

General Information

1.1 Introduction

iPS is an industrial power storage system and is designed to provide DC power to various equipment which are used in a mobile environment. With a Lithium Iron Phosphate (LFP) cell, iPS has a larger battery capacity and lighter weight than traditional battery systems (Lead Acid). LFP batteries are also safer, more stable, and cleaner than other types of battery, and iPS is suitable for installation in mobile carts which are used in hospitals and other applications that need a higher standard of safety and are harmless to the environment.

1.2 Specifications

Category	Attribute	iPS-M Series
Power Supply	Battery Type	Lithium-Iron Phosphate
	Battery Capacity	420 Wh
	Battery Life Span	DOD 80%, 2000 cycles
	Charge Time	< 3 hr. DOD 100%
	Input Voltage	100 ~ 240 Vac, 50 ~ 60 h, Max 4.5 A
	DC Output Voltage	System 1: 15 ~ 19 Vdc, Max 6 A System 2: 12 Vdc, Max 4 A
	Charging Status Indicators	LEDs with continuous readout; intelligent software
I/O Ports	DC Output Interface	DC Jack (4-pin mini lock din)
	Communication Interface	RS-232
Environment	Vibration	5 ~ 500 Hz, 1 G (Testing)
	Cooling System	Fanless
	Water Resistance	IPX1 from top (Pending), IP67 DC output connector
Physical Characteristics	Dimensions (L x W x H)	282 x 260 x 101 mm (11.1 x 10.2 x 3.9 inch)
	Weight	8 kg
	Certifications	UL60601-1/EN60601-1 (Pending) ; CE , FCC Class B ; CCC certified (Pending)
Power Manager Software	AMiS_Link	Battery capacity indicator
		Alerts (battery capacity, temperature, warning)
		Battery Life cycle statistics
		Report & log file
		Client Installation Server Installation (Optional)
		Multi-language support, including Chinese Traditional, Chinese Simple, English, German and Dutch

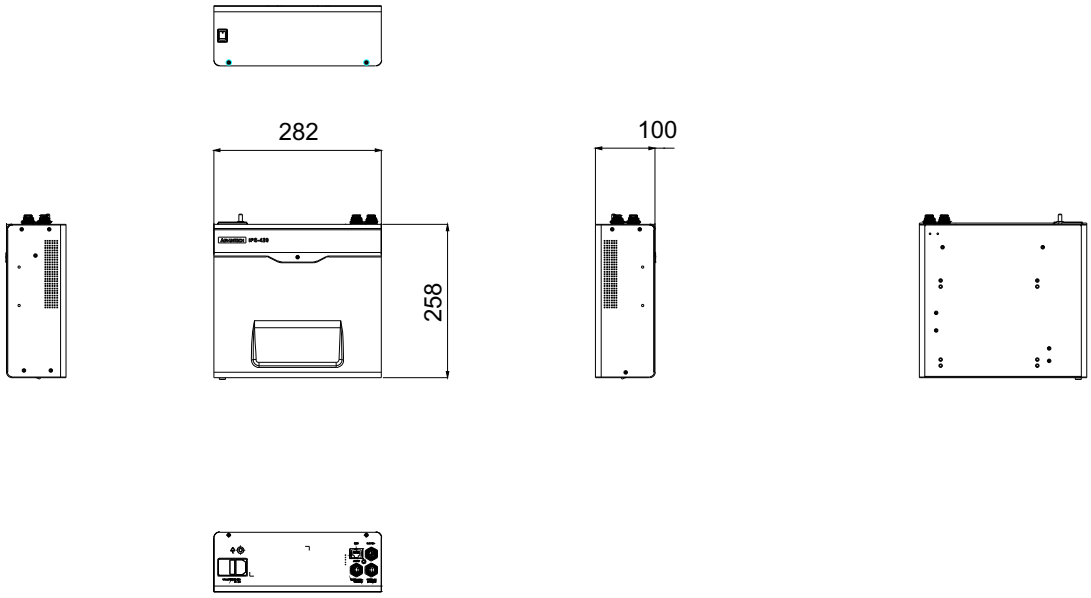
1.3 Remote Control Specifications

Category	Attribute	iPS-REMT
Physical Characteristics	Dimensions (L x W x H)	80 x 48 x 14 mm (3.1 x 1.8 x 0.5 inch)
	Weight	0.3 kg
Display & Controller	Power Button	Battery power button
	LED Display	LED indicator

1.4 DC to DC Converter Specifications

Category	Attribute	iPS-REMT
Physical Characteristics	Dimensions (L x W x H)	54 x 23 x 12 mm (2.1 x 0.9 x 0.4 inch)
	Weight	0.4 kg
I/O ports	DC-In	12 ~ 24 Vdc, 8 ~ 3 A
	DC-Out	Mode 1: 12 Vdc, 6 A Mode 2: 15 Vdc, 5 A Mode 3: 16 Vdc, 5 A Mode 4: 19 Vdc, 4 A

1.5 Dimensions



Chapter 2

Getting Started

2.1 Overview of the iPS-M Battery

Before starting to use iPS, take a moment to become familiar with the functions of connectors, switches, and ports, which are illustrated in the figures below.

Figure 2.1 I/O Ports and AC Connector

1	System 1, 15 ~ 19 Vdc, 6 A
2	System 2, 12 Vdc, 4 A
3	Remote control connector
4	RJ-45 (to RS-232) connector
5	AC In and AC On/Off Switch, 100 ~ 240 Vac / F4A
6	Ground Pin

Figure 2.2 Front View with AC Switch

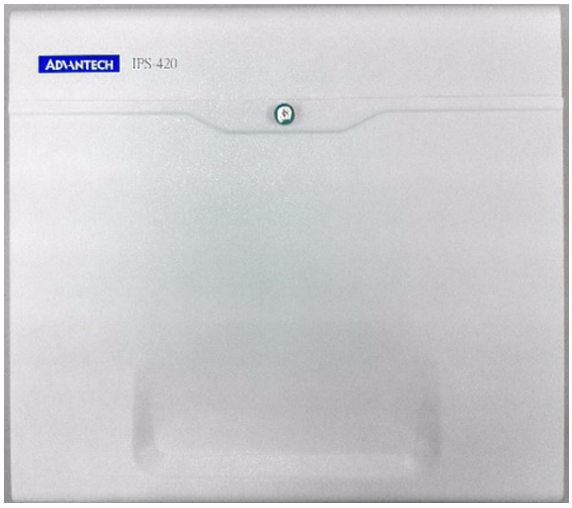


Figure 2.3 Top view

2.2 Overview of iPS-M Battery Remote Control

Remote control is managed by a switch for the iPS-M battery. There is a Power On/Off button and an LED indicator to display battery capacity. See Figure 2.4 for button and LED indicator.

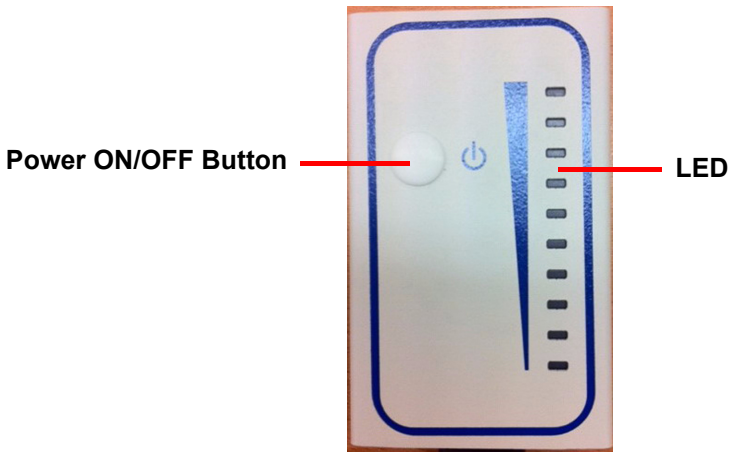


Figure 2.4 Remote Control

2.3 Battery Charging

When purchasing an iPS-M battery, a battery charge MUST be peformed before providing power to other devices.

To charge the battery, connect the AC power cord and turn on the two AC power switches; one next to the power cord, and the second of the front of the unit. Also, connect a remote control to the battery and the press power on button (press and hold at least 7 seconds) to turn on power.

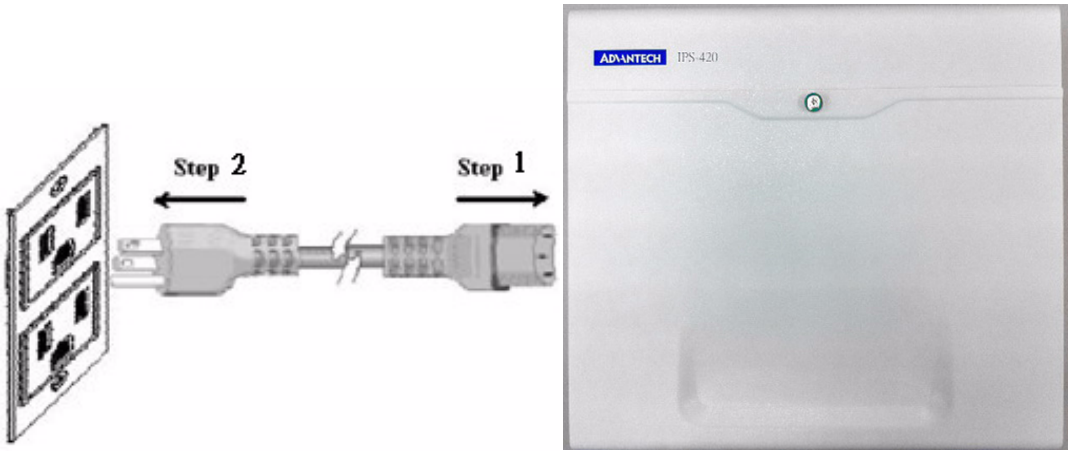


Figure 2.5 Connecting AC Power Cord with iPS-M Battery

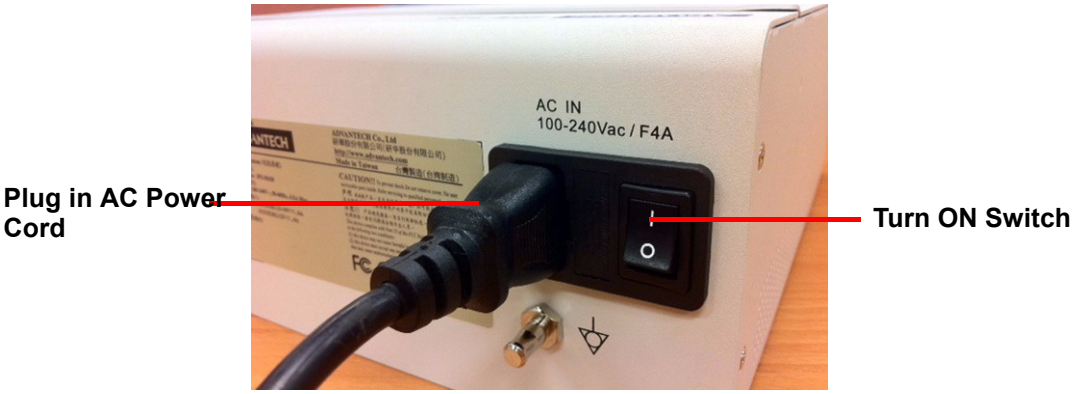


Figure 2.6 AC Power Cord Connected and Power Switch On

Figure 2.7 AC power switch on

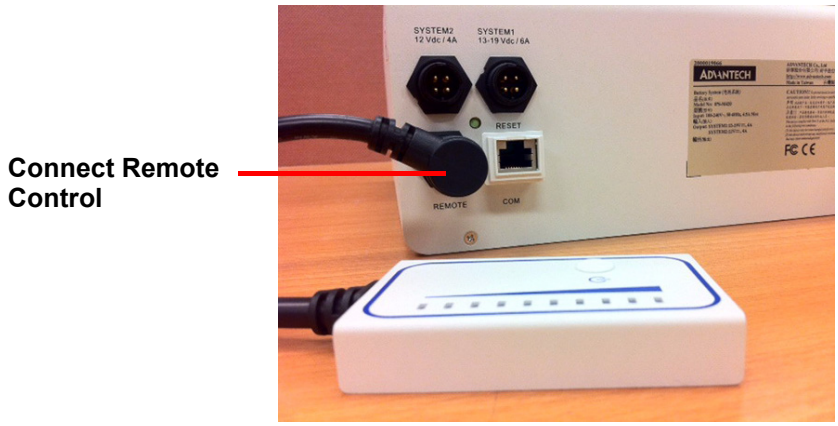


Figure 2.8 Connecting Remote Control

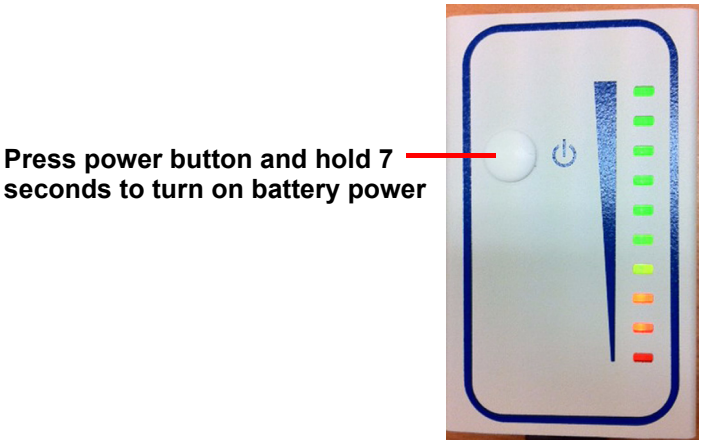


Figure 2.9 Power ON Battery

While the battery is charging, an LED indicator will flash. When the battery capacity reaches 100%, the LED indicator will change to solid on..

Caution! *After purchasing a new iPS-M power storage system, the battery must be charged to 100%, which will keep the battery cell in an active status and extend the battery life.*

Caution! *When charged to 100%, it is better to remove from AC power to prevent OVER CHARGING which may decrease battery life time.*

2.4 Battery Discharging

The iPS-M battery provides 2 output modes to provide power to PC or other devices. DC power is provided from one or both of the DC output ports.

Max Watt for System 1 and System 2 output:

System 1: 19 V x 6 A = 114 W

System 2: 12 V x 4 A = 48 W

Maximum output is around 160 W.

2.4.1 Device Connection

Before connecting equipments to iPS-M battery system, turn off the battery power from the remote control first. Then connect the cable to the battery system and the equipment.

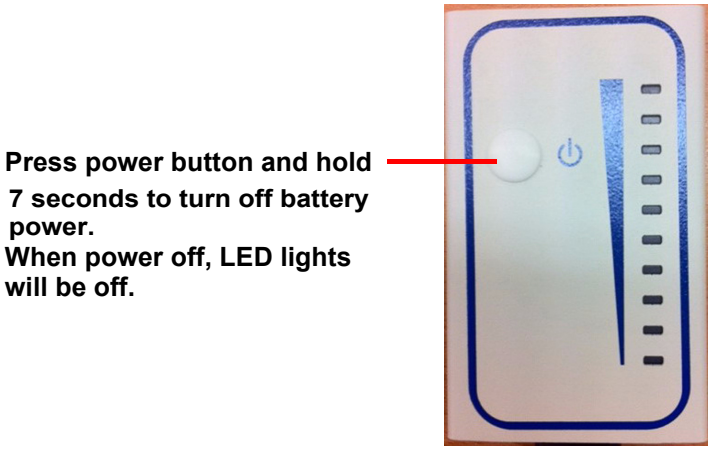


Figure 2.10 Battery Power Off

Connect the iPS-M battery cable to System 1 or System 2 port, depending on equipment's defined voltage.

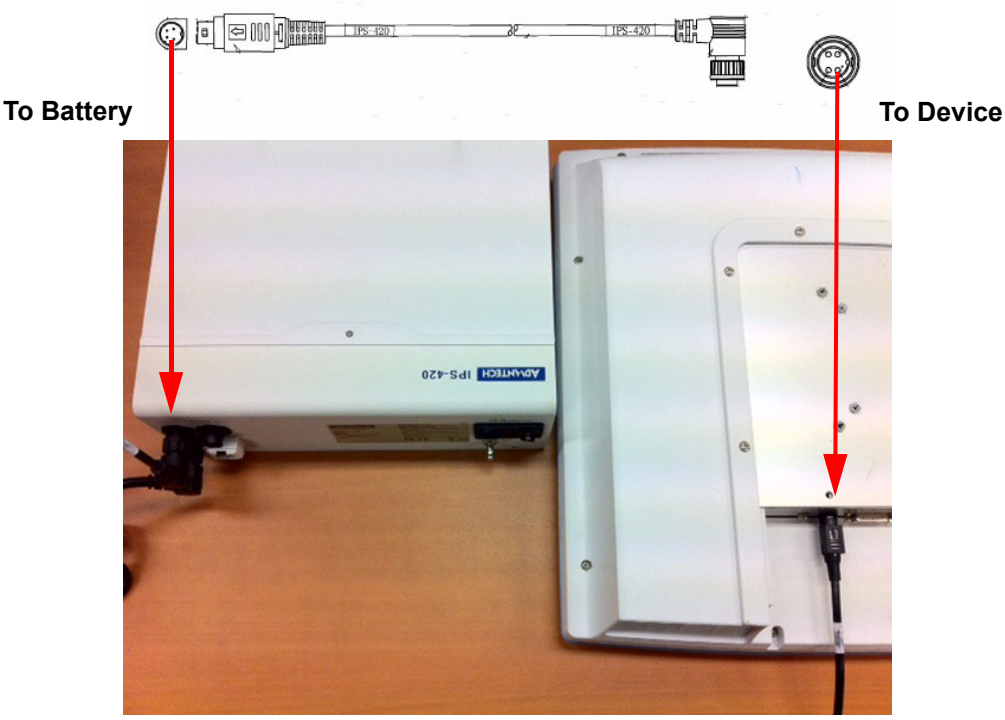


Figure 2.11 Cable Connection

After all cables are properly connected, turn on the battery power by pressing the power button (hold 7 seconds) on the remote control again. The battery is ready to supply DC power to device.

2.4.2 Discharge Time Estimation

To estimate discharge time, one must know the power consumption of the load device (PC or other device). For illustration purposes, assume power consumption of a load device is 40Wh; the discharge time for the different capacity iPS-M batteries is as listed in the following table:

Model	Discharge Time Estimation
iPS-M420	> 10 hours (420 Wh / 40 Wh)
iPS-M210	> 5 hours (210 Wh / 40 Wh)

2.4.3 Low Capacity Warning

When battery capacity is lower than 10%, battery protection activation will follow one of two scenarios:

1. Discharge is lower than 10% during normal usage:
   The RED LED keeps flashing and a warning BEEP sound is triggered. The BEEP sound will continue until the battery is plugged into AC power. When battery capacity reaches 0%, the battery system shuts down automatically.
2. Battery initial capacity is lower than 10%:
   If battery capacity is less than 10% initially, when pressing the power on button on the remote control to turn on the battery, the RED LED will flash continuously and a warning BEEP sound is triggered. The BEEP sound will continue until the

battery is plugged into AC power. When battery capacity is 0%, the battery system shuts down automatically.

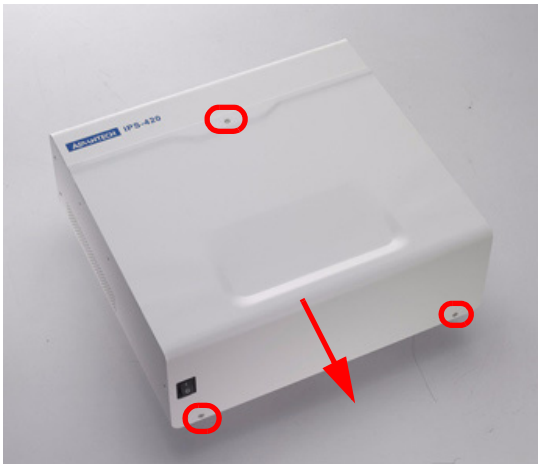
Warning! *When battery capacity is 0%, it MUST BE RECHARGED WITHIN 48 HOURS, which keeps the battery cell alive and extends battery life.*

2.5 Battery Pack Replacement

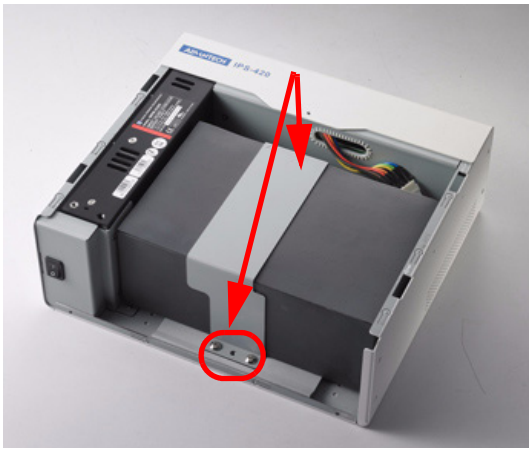
The iPS-M battery system battery pack can be replaced in just 4 easy steps:

1. Turn AC power switch off.

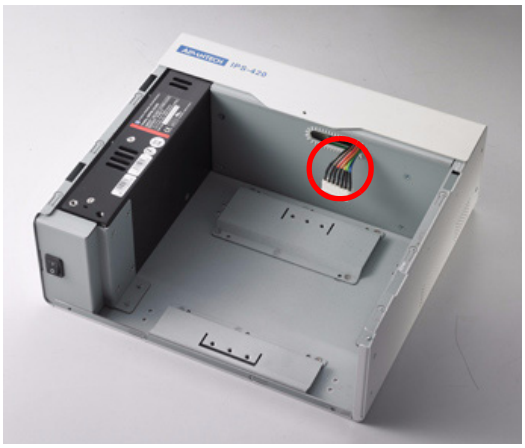
2. Remove top cover screws and top cover.



3. Remove screws on battery pack holder.



4. Disconnect battery cell cable and system cable to remove old battery cell and replace with new one.



Reverse the steps above to reassemble the battery system.

Chapter 3

Battery Maintenance

3.1 Regular Use

There are 3 key points to remember when maintaining the battery system:

1. When the battery is new, charge it to 100% immediately before first use.
2. When power capacity is lower than 30%, the LED indicator appears orange. Plug into AC power to recharge.
3. If the battery is overdischarged, PCs or connected devices are shut down or powered down. The battery must be recharged within 48 hours (2 days) to maintain longer battery life.

3.2 Storing the Battery

If the battery system or battery pack is going to stored in a warehouse for a long time, the following tasks need to be performed:

1. When battery is new, charge it to 100% immediately before moving it to warehouse.
2. Before storing the battery in a warehouse or leaving it in idle status, it must be recharged to 100%.
3. If the battery is not to be used or will be idle for a long time, in addition to charging to 100% prior to moving it to the warehouse, it is also suggested to rechange it regularly:
   For 400 Wh battery: once a year
   For 200 Wh battery: once every 6 months

3.3 Troubleshooting

If the battery system runs into an abnormal condition, such as:

1. Failure to power on
2. Failure to power off
3. Remote LED ON but no DC power output
4. AC power in and all switches ON, but battery doesn't recharge

Use the reset button on the battery system and follow these recovery steps:

1. Press reset button once (When battery is powered down and remote LED off).
2. Press power button (Hold for 7 seconds) on the remote control to power on.
3. When LED lights come back on, the battery system has been recovered.

Warning! *When the battery is going to be stored for a long time, make sure to recharge to 100% capacity. If stored over a year, it is suggested to recharge the system as follows:*

Once every year for 400 Wh battery

Once every 6 months for 200 Wh battery

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